

Recent Status of Willow Ptarmigan in China

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Abstract The recent distribution status of Willow ptarmigan (*Lagopus lagopus*) in China was studied by picture issuing, interview and on-the-spot investigation from 1992 to 1997. Results showed that Willow ptarmigan was a critically endangered species in China. It was distributed rarely in the northwestern region of the Daxing'an Mountains. Willow ptarmigan found in China belonged to *L. l. serebrosky* in sub-species position.

Key words: Willow ptarmigan, Distribution, Recent status, Sub-species.

Introduction

Willow ptarmigan (*Lagopus lagopus*), belonging to Grouse, has been put on the second-class of protected animal in China. It likes Hazel grouse in the bodily form and size, but plumage color changes in the four season of one year. The body plumage of male and female is white in winter, only tail plume is black. So, Willow ptarmigan has long been known as the "white Hazel grouse". Willow ptarmigan is circumboreal species. Distribution range spreads over the entire forest zone and steppe zone, even tundra zone from the northern part of North America to the northern part of all Eurasia. The species distribution in China was recorded as early as the 1930's (Wilder, 1938). Heilongjiang River Valley is the south edge of this bird distribution zone. Before 1960's, Willow ptarmigan were found from time to time in the Daxing'an Mountains (Ma Yiqing, 1989). Although the population density was less than that of the Hazel grouse (*Bonasa bonasia sibiricus*), Black grouse (*Lyrurus tetrix ussuriensis*) and Black-billed capercaillie (*Tetrao parvirostris*); The quantity had gradually reduced after 1960's as result of forest cutting, excessive hunting, and climate change. None of Willow ptarmigan has been found in the wildlife investigation of the Daxing'an Mountains since 1970. Many ornithology specialists suspect whether or not the species exist yet in China. In addition, there are controversies between some specialists on the sub-species position and resident type of Willow ptarmigan found in China. It is a matter of primary importance to make clear the species distribution and recent status of Willow ptarmigan in China. In order to save the endangered species and protect the biodiversity of cold temperate zone, we carried out a systematic investigation and study on original distribution region of Willow ptarmigan by pictures issuing, interview and on-the-spot investigation from 1992 to 1997. We issued over 2000 sheets of pictures, interviewed 120 forest farms

of 31 forest management bureaus or counties and investigated on-the-spot in 8 forest management bureaus of Mangui, Alongshan, Merdaoga, Xilinji, Tuqiang, Amur, Tahe and Huzhong. We also set up 816 census lines, about 9 792 km in total length. The sample area (1958 km²) accounted for 9.8 per cent of all area.

Methods

Pictures issuing Over 2000 sheets of Willow ptarmigan pictures with caption were given out to the people of possible area. It attracted the broad masses of the people attention to the species and interest to the investigation work.

Table 1. Survey sites and time on Willow ptarmigan in Northeastern of China.

| Time (Year, Month) | Ways | Sites |
|-----------------------|-------------|---|
| 1992. 11-12 | interview | Honghuaerji, Yakeshi, Genhe, Jinhe, Tulihe |
| 1993. 2-3 | interview | Mangui, Alongshan, Merdaoga, derbuer |
| 1993. 11-12 | interview | Huzhong, Xinlin, Fukeshan |
| 1994. 2-3 | interview | Yaohe, Fuyuan, Tongjiang, Suibin |
| 1994. 5-6 | interview | Zhanhe, Tongbei |
| 1994. 11-12 | on-the-spot | Mangui |
| 1995. 2-3 | interview | Xilinji, Tuqiang, Amur, Tahe, Shibazhan, Hanjiayuanzi |
| 1995. 11-12 | on-the-spot | Xilinji, Tuqiang, Amur, Tahe |
| 1996. 1-3 | on-the-spot | Huzhong, Alongshan, Merdaoga |
| 1996. 5-6 | interview | Yichun, Wuying, Xinqing, Tangwanghe, Wuyiling |
| 1996. 11-12 | interview | Huma, Heihe, Sunwu, Xunke |
| 1997. 1-2 | interview | Jiayin, Luobei, Hebei |
| 1997. 5-6 | interview | Jiagedaqi, Songling, Dayangshu, Alihe |

Interview Willow ptarmigan the original distribution range was interviewed and inspected to be recorded in historical literature, in order to define the

possible range at present. Interview objects mainly were the local hunter (especially the minority nationalities), forest protector, forest policeman, frontier guard and bird enthusiast. In addition, we paid a visit to bird specialists concerned, and listened to some views on the species distribution range yet.

Investigation on-the-spot It was investigated on-the-spot by belt transect method that all possible and key areas were determined through interview and information fed back. Belt transect is 200 m width, and length is beyond 10 km.

Survey sites and time On the basis of the relevant literatures^[2, 3, 4, 6], the Heilongjiang River Valley and Along the Erguna River were determined as main survey sites. Detailed sites and survey time were listed in Table 1.

Results

Distribution status

We gathered some information of great value on Willow ptarmigan distribution by interview. In November 1992, three people hunted a Willow ptarmigan at Gaodi Forestry Farm of Mangui Forest Management Bureau. This specimen has been kept in the specimen-room of Mangui Forest Management Bureau. It is only one Willow ptarmigan specimen obtained within the boundaries of our country so far. On the basis of measurements for this bird, body weight is 718 g, body length 375 mm, wing length 204 mm, tail length 115 mm, bill length 11.7 mm and middle toe is 28.5 mm. The collection site of specimen lies to over cutting forest land, on which the constructive tree species mainly are *Larix gmelinii*, *Betula platyphylla*, and main shrub species are *Populus davidiana*, *Rhododendron dauricum*, *Salix* spp., *Vaccinium* spp. and *Betula* spp. In December 1990, Zhao Quansheng caught sight of one Willow ptarmigan, which mixed with Hazel grouse flock at Hexi Forestry Farm of Mangui Forest Bureau. In winter of 1989 and 1990, Yang Jingsheng (forestry technical personnel) caught sight of a Willow ptarmigan at Beian Forestry Farm of Mangui Forest Bureau. In November 1994, Yang Huaizhu (hunter) caught sight of two Willow ptarmigan at Meikuang Forestry Farm of Xilinji Forest Bureau.

Wang Xiping (older worker of Tuqiang Forest Management Bureau) said he caught sight of Willow ptarmigan once in forest areas from Mehe to Luoguhe before 1970's, but did not see in recent ten years. In November 1994, Zhang Si (forest protector) caught sight of two Willow ptarmigan at 28th station Forestry farm of Tuqiang Forest Bureau. The body size and form of these birds were greatly similar to that of Hazel grouse. Their body plumage was roughly white, but not pure white. In December 1985,

Che Yengui (hunter) of Tahe Forest Bureau hunted a Willow ptarmigan, which mixed with Hazel grouse flock at the fire tower of Yanjing Forestry Farm. He regarded it as Hazel grouse at that time. Then he found that it differed from Hazel grouse when he picked up this bird. He said that all plumageis were white except tail plume (black), and red eyelid, black bill, toes with white feather. In winter of 1988, Zhang Qixiang (forest protector) caught sight of one Willow ptarmigan once at Pangu Forestry Farm of Tahe Forest Management Bureau.

In winter of 1986 and 1998, Liu Hongfa caught sight of two and three Willow ptarmigan respectively at Feihushan and Dongfanghong Forestry Farm of Huzhong Forest Bureau. In addition, on the basis of reflection by the minority nationality hunter of the Ewenke, Willow ptarmigan also was met by chance in the Alongshan and Merdaoga forest areas. According to above interview results, Alongshan, Merdaoga, Mangui, Huzhong, Tahe, Amur, Tuqiang, Xilinji and Fukeshan forest areas in northern part of the Daxing'an Mountains were determined as the investigation sites on-the-spot. The areas above were investigated on the spot extensively in winter of 1994, 1995 and 1996. 816 census lines were set up; sum of line length was about 9792 km. The census results showed that, none of Willow ptarmigan and action trace were found on the all census lines, though the vegetation conditions in these areas were similar to that in the habitats of this species in Russian and North-Europe. Willow ptarmigan has been listed critically endangered species. And it was found difficulty by the local people, so, it was reasonable that none of alive bird and action trace was found in this investigation on the spot. However, we don't think that Willow ptarmigan has disappeared in China, because it belongs to the winter-migratory bird of seldom seen. Now, Willow ptarmigan only distributes over the northern part of Daxing'an Mountains in winter in China. The concrete range of Willow ptarmigan in China is south from Mountain and Merdaoga, toward north, passing through Mangui and west part of Huzhong, up to Mehe; east from west part of Tahe, toward to west, passing through Amur, Xilinji and Fukeshan, up to the Erguna River.

Sub-species position of the Willow ptarmigan

This species has 15 sub-species in the whole world. There are 10 sub-species in Eurasia and 6 sub-species in the northern of America. According to the report^[2,3], Willow ptarmigan in China belongs to *L. l. okadai*, but according to "Russian Birds"^[6], *L. l. okadai* is only distributed over Sahalin Island. It has been known that the distribution range of Willow ptarmigan in China is far from the Sahalin Island in longitude. In addition, there still exist the sub-species of *L. l. sere-*

browsky in these places. *L. l. serebrowsky* distributed over the southern part of East-Siberia, west from east bank of the Lake Baikal, toward east, passing through Aburonov and Sitanov Mountains, up to the lower reaches of Amur River and Sikhote Mountains; toward south, might spread to the bank of Erguna River. The northern part forest areas of Daxing'an Mountains join with the distribution range of *L. l. serebrowsky* in Russian by Erguna and Heilongjiang (Amur) River appropriately. So, Willow ptarmigan in the northern part of Daxing'an Mountains ought to come from Sitanov and Aburonov Mountains, and not come from Sahalin Island. Up sum to, it was not proper that Zheng Zuoxin had incorporated Willow ptarmigan in China with the sub-species of *L. l. okadai*. According to analysis in the geographic distribution, it might be accepted that individuals in China are incorporated with the sub-species of *L. l. serebrowsky*.

Analysis of endangered factors

Willow ptarmigan belongs to winter migratory bird in China. Its population density depends on the species distribution, foods and climatic status in East-Siberia of Russian each year. Willow ptarmigan's population size is cyclical changing in the time. The period varies, not only between sub-species but also in same sub-species. Average period is about 3-4 years in some region, even is about 10 years in other region. After population's size reaches a peak, it begins to decline at once as a result of inadequate food resources, natural enemy and infectious disease. This is a general law of its population cyclical changing. In recent years, the distribution range of *L. l. serebrowsky* has been shrinking back to the north of East-Siberia, and population has been declining year by year in Sitanov and Aburonov Mountains. Now, Willow ptarmigan is very rarely near the north bank of Amur River (Heilongjiang River). So, the main endangered factors of Willow ptarmigan in China are the distribution range shrinking back to north and density declining in breeding place. The reason of the

distribution range shrinking back could contribute to the climate becoming warm in recent years. In addition, the people economic actions are one of endangered factors in China. After exploiting and construction in the forest for 30 years, the forest area of Daxing'an Mountains has become an important base of timber production. Now, forestry farmers and villages have spread over this entire area, and the population people have grown from 3000 in 1964 (Ma Yiqing, 1989) to 430 thousands (only Heilongjiang Province). People economic actions have seriously influenced wildlife habitat and existence. It results in that some species become rare, even disappear. Grouse is typical species of this area. Their distribution ranges have shrunk back step by step because of forest cutting, hunting and fire. Now, Black billed Capercaillie (*Tetrao parvirotris*) and Black Grouse (*Lyrurus tetrix*) have become rare, and Hazel grouse population has obviously reduced too, as well as Willow ptarmigan.

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